For example, U.S. Patent No. 5,639,266 to Stewart discloses a compensation approach for modular jack housings that involves aligning the lead frames of the opposite pairs in an uniformed parallel pattern to removed crosstalk noises. The Stewart connector is defined by two lead frame section areas, section one being the matable area for electrical plug contact and section two being the output area of the modular jack housing. Stewart's section one aligns two lead frames, namely, positions 3 and 5 out of 8, in an uniformed and reversed signal parallel pattern from lead frame tip to the bend location that enters section two, thus reducing crosstalk noises by signal compensation. Section two also aligns the lead frames in an uniformed parallel pattern from lead frame bend location to lead frame stagger array output, which minimizes NEXT, but due to the imbalances of the center wire pairs 1 and 3, FEXT noises are disadvantageously increased according to the Stewart '266 design.

Another example of crosstalk compensation methodology is disclosed in U.S. Patent No. 5,647,770 to Berg and U.S. Patent No. 5,779,503 to Nordx/CDT. These two patents disclose compensation approaches for modular jack housings that involve aligning and re-bending the lead frames of the opposite pairs in an uniformed parallel pattern to contribute to crosstalk noise reduction. The Berg and Nordx/CDT devices utilize *de facto* standard rear entry pin positions of 0.1 inch separation for all pair arrays after the deformation of the wire pairs. The re-bending of lead frames as disclosed by the Berg '770 and Nordx/CDT '503 patents is an expensive process and the crosstalk reductions addressed by these disclosures occur mainly within the second section of their respective designs. Another method for crosstalk noise reduction and control in connecting hardware is addressed in commonly assigned U.S. Patent No. 5,618,185 to Aekins, the disclosure of which is hereby incorporated by reference.

In view of the increasing performance demands being placed on UTP systems, e.g., the implementation of category 6 standards, it would be beneficial to provide a device and/or methodology that reduces NEXT and FEXT noises associated with standard FCC

part 68.500 modular jack housings in a simple and cost effective manner. These and other objectives are achieved through the advantageous modular jack housings disclosed herein.

SUMMARY OF THE DISCLOSURE

The present disclosure provides a modular plug dielectric insert device for a data/voice communication system modular jack housing that advantageously reduces NEXT and FEXT.

In another aspect of the present disclosure, a modular plug dielectric insert device is disclosed that is particularly adapted for being seated in a data/voice communication system modular jack housing that will reduce signal delay from the plugs input to the IDC terminal outputs to better control NEXT and FEXT of a connecting hardware.

In addition, a modular jack dielectric insert device for data/voice systems is provided that will not deform the wire pairs in a standard EIA T568B style wire configuration and is simple, low cost and easy to implement into a modular housing. Preferred lead frame wires according to the present disclosure are simple in form, but are precisely bent in proper direction(s) to reduce noise and re-balance the signal pairs in a simple and low cost manner, without reducing the impedance characteristics of the wire pairs.

Devices and/or systems according to the present disclosure include an insert in the data signal transmission media plug receiving space of a modular housing. The insert is preferably composed of a dielectric support member having a plurality of pairs of electrically conductive elongated members. Each elongated member generally includes a front end portion which includes a contact portion exposed in the receiving space of the modular housing for making electrical contact with the media plug contacts. The elongated conductive members also have rear end portions that include an electrically

conductive connector device for connecting and transmitting a signal to other devices. The use of the terms "front" and "rear" is in no way meant to be limiting. A substantial amount of the electrical noise is removed according to the present disclosure by the positional relationships of the elongated members with respect to each other. Thus, a capacitance is formed by the adjacency and/or degree of separation of the members which advantageously compensates for electrical noise during transmission of a signal.

In one aspect in accordance with the present disclosure, the plurality of pairs of elongated members have substantially multilaterally symmetrical portions and substantially multilaterally asymmetrical portions.

In another aspect in accordance with the present disclosure, the front end portions of the elongated conductive members are substantially multilaterally symmetrical and the rear end portions are substantially multilaterally asymmetrical.

In another aspect in accordance with the present disclosure, the front end portions are substantially parallel.

In another aspect in accordance with the present disclosure, each pair of the plurality of pairs of elongated members includes a ring member and a tip member. The ring and tip members may be separated so that the ring members are on the same plane, that is, in one row, and the tip members are in another row. Preferably, these rows of conductors are spaced apart.

In another aspect in accordance with the present disclosure, the front end portions of the elongated members may be partially or fully made up of arcuate sections that extend the elongated members into the receiving space, and aid with mating forces between the plug and insert, among other things.